

**Project Management Indicator Species Report
For the
Boulder Creek Fuels Restoration Project**

Hume Lake Ranger District

Sequoia National Forest and Giant Sequoia National Monument

Prepared by:

/s/ Jeff Cordes

Jeff Cordes, District Wildlife Biologist

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1. Introduction

The purpose of this report is to evaluate and disclose the impacts of the Boulder Creek Fuels Restoration Project (Boulder Project) on the habitat of the thirteen (13) Management Indicator Species (MIS) identified in the Sequoia National Forest (SQF) Land and Resource Management Plan (LRMP) (USDA 1988) as amended by the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (USDA Forest Service 2007a). This report documents the effects of the proposed action and alternatives on the habitat of selected project-level MIS. Detailed descriptions of the Boulder Project alternatives are found in the Boulder Creek Fuels Restoration Project Environmental Assessment (USDA Forest Service 2012).

MIS are animal species identified in the SNF MIS Amendment Record of Decision (ROD) signed December 14, 2007, which was developed under the 1982 National Forest System Land and Resource Management Planning Rule (1982 Planning Rule) (36 CFR 219). Guidance regarding MIS set forth in the SQF LRMP as amended by the 2007 SNF MIS Amendment ROD directs Forest Service resource managers to (1) at project scale, analyze the effects of proposed projects on the habitat of each MIS affected by such projects, and (2) at the bioregional scale, monitor populations and/or habitat trends of MIS, as identified in the SQF LRMP as amended. Note that the 2012 Giant Sequoia National Monument Plan amendment to the SQF LRMP adopted the 2007 SNF MIS direction.

1.a. Direction Regarding the Analysis of Project-Level Effects on MIS Habitat

Project-level effects on MIS habitat are analyzed and disclosed as part of environmental analysis under the National Environmental Policy Act (NEPA). This involves examining the impacts of the proposed project alternatives on MIS habitat by discussing how direct, indirect, and cumulative effects will change the habitat in the analysis area.

These project-level impacts to habitat are then related to broader scale (bioregional) population and/or habitat trends. The appropriate approach for relating project-level impacts to broader scale trends depends on the type of monitoring identified for MIS in the LRMP as amended by the SNF MIS Amendment ROD. Hence, where the SQF LRMP as amended by the SNF MIS Amendment ROD identifies distribution population monitoring for an MIS, the project-level habitat effects analysis for that MIS is informed by available distribution population monitoring data, which are gathered at the bioregional scale. The bioregional scale monitoring identified in the SQF LRMP, as amended, for MIS analyzed for the Boulder Project is summarized in Section 3 of this report.

Adequately analyzing project effects to MIS generally involves the following steps:

- Identifying which habitat and associated MIS would be either directly or indirectly affected by the project alternatives; these MIS are potentially affected by the project.
- Summarizing the bioregional-level monitoring identified in the LRMP, as amended, for this subset of MIS.

- Analyzing project-level effects on MIS habitat for this subset of MIS.
- Discussing bioregional scale habitat and/or population trends for this subset of MIS.
- Relating project-level impacts on MIS habitat to habitat and/or population trends at the bioregional scale for this subset of MIS.

These steps are described in detail in the Pacific Southwest Region's draft document "MIS Analysis and Documentation in Project-Level NEPA, R5 Environmental Coordination" (May 25, 2006) (USDA Forest Service 2006a). This Management Indicator Species (MIS) Report documents application of the above steps to select project-level MIS and analyze project effects on MIS habitat for the Boulder Project.

1.b. Direction Regarding Monitoring of MIS Population and Habitat Trends at the Bioregional Scale.

The bioregional scale monitoring strategy for the Sequoia NF's MIS is found in the Sierra Nevada Forests Management Indicator Species Amendment (SNF MIS Amendment) Record of Decision (ROD) of 2007 (USDA Forest Service 2007a). Bioregional scale habitat monitoring is identified for all twelve of the terrestrial MIS. In addition, bioregional scale population monitoring, in the form of distribution population monitoring, is identified for all of the terrestrial MIS except for the greater sage-grouse. For aquatic macroinvertebrates, the bioregional scale monitoring identified is Index of Biological Integrity and Habitat. The current bioregional status and trend of populations and/or habitat for each of the MIS is discussed in the 2010 Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2010a).

• MIS Habitat Status and Trend.

All habitat monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service 2007a).

Habitats are the vegetation types (for example, early seral coniferous forest) or ecosystem components (for example, snags in green forest) required by an MIS for breeding, cover, and/or feeding. MIS for the Sierra Nevada National Forests represent 10 major habitats and 2 ecosystem components (USDA Forest Service 2007a), as listed in Table 1. These habitats are defined using the California Wildlife Habitat Relationship (CWHR) System (CDFG 2005). The CWHR System provides the most widely used habitat relationship models for California's terrestrial vertebrate species (ibid). It is described in detail in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

Habitat status is the current amount of habitat on the Sierra Nevada Forests. Habitat trend is the direction of change in the amount or quality of habitat over time. The methodology for assessing habitat status and trend is described in detail in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

- **MIS Population Status and Trend.**

All population monitoring data are collected and/or compiled at the bioregional scale, consistent with the LRMP as amended by the 2007 SNF MIS Amendment ROD (USDA Forest Service 2007a). The information is presented in detail in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

Population monitoring strategies for MIS of the Sequoia NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment ROD (USDA Forest Service 2007a). Population status is the current condition of the MIS related to the population monitoring data required in the 2007 SNF MIS Amendment ROD for that MIS. Population trend is the direction of change in that population measure over time.

There are a myriad of approaches for monitoring populations of MIS, from simply detecting presence to detailed tracking of population structure (USDA Forest Service 2001, Appendix E, page E-19). A distribution population monitoring approach is identified for all of the terrestrial MIS in the 2007 SNF MIS Amendment, except for the greater sage-grouse (USDA Forest Service 2007a). Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time. Presence data are collected using a number of direct and indirect methods, such as surveys (population surveys), bird point counts, tracking number of hunter kills, counts of species sign (such as deer pellets), and so forth. The specifics regarding how these presence data are assessed to track changes in distribution over time vary by species and the type of presence data collected, as described in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

- **Aquatic Macroinvertebrate Status and Trend.**

For aquatic macroinvertebrates, condition and trend is determined by analyzing macroinvertebrate data using the predictive, multivariate River Invertebrate Prediction and Classification System (RIVPACS) (Hawkins 2003) to determine whether the macroinvertebrate community has been impaired relative to reference condition within perennial water bodies. This monitoring consists of collecting aquatic macroinvertebrates and measuring stream habitat features according to the Stream Condition Inventory (SCI) manual (Frasier et al. 2005). Evaluation of the condition of the biological community is based upon the “observed to expected” (O/E) ratio, which is a reflection of the number of species observed at a site versus the number expected to occur there in the absence of impairment. Sites with a low O/E scores have lost many species predicted to occur there, which is an indication that the site has a lower than expected richness of sensitive species and is therefore impaired.

2. Selection of Project level MIS

Management Indicator Species (MIS) for the Sequoia NF are identified in the 2007 Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007a). The habitats and ecosystem components and associated MIS analyzed for the project were selected from this list of MIS, as indicated in Table 1. In addition to identifying the habitat or ecosystem components (1st column), the CWHR type(s) defining each habitat/ecosystem component (2nd column), and the associated MIS (3rd column), the Table discloses whether or not the habitat of the MIS is potentially affected by the Boulder Project (4th column).

Table 1. Selection of MIS for Project-Level Habitat Analysis for the Boulder Project.

Habitat or Ecosystem Component	CWHR Type(s) defining the habitat or ecosystem component ¹	Sierra Nevada Forests Management Indicator Species <i>Scientific Name</i>	Category for Project Analysis ²
Riverine & Lacustrine	lacustrine (LAC) and riverine (RIV)	aquatic macroinvertebrates	1
Shrubland (west-slope chaparral types)	montane chaparral (MCP), mixed chaparral (MCH), chamise-redshank chaparral (CRC)	fox sparrow <i>Passerella iliaca</i>	3
Oak-associated Hardwood & Hardwood/conifer	montane hardwood (MHW), montane hardwood-conifer (MHC)	mule deer <i>Odocoileus hemionus</i>	3
Riparian	montane riparian (MRI), valley foothill riparian (VRI)	yellow warbler <i>Dendroica petechia</i>	1
Wet Meadow	Wet meadow (WTM), freshwater emergent wetland (FEW)	Pacific tree (chorus) frog <i>Pseudacris regilla</i>	2
Early Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2, and 3, all canopy closures	Mountain quail <i>Oreortyx pictus</i>	3
Mid Seral Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 4, all canopy closures	Mountain quail <i>Oreortyx pictus</i>	3
Late Seral Open Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P	Sooty (blue) grouse <i>Dendragapus obscurus</i>	3
Late Seral Closed Canopy Coniferous Forest	ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6.	California spotted owl <i>Strix occidentalis occidentalis</i>	3
		American marten <i>Martes americana</i>	
		northern flying squirrel <i>Glaucomys sabrinus</i>	
Snags in Green Forest	Medium and large snags in green forest	hairy woodpecker <i>Picoides villosus</i>	3
Snags in Burned Forest	Medium and large snags in burned forest (stand-replacing fire)	black-backed woodpecker <i>Picoides arcticus</i>	2

¹ All CWHR size classes and canopy closures are included unless otherwise specified; **dbh** = diameter at breast height; **Canopy Closure classifications:** S=Sparse Cover (10-24% canopy closure); P= Open cover (25-39% canopy closure); M= Moderate cover (40-59% canopy closure); D= Dense cover (60-100% canopy closure); **Tree size classes:** 1 (Seedling)(<1" dbh); 2 (Sapling)(1"-5.9" dbh); 3 (Pole)(6"-10.9" dbh); 4 (Small tree)(11"-23.9" dbh); 5 (Medium/Large tree)(≥24" dbh); 6 (Multi-layered Tree) [In PPN and SMC] (Mayer and Laudenslayer 1988).

² **Category 1:** MIS whose habitat is not in or adjacent to the project area and would not be affected by the project.

Category 2: MIS whose habitat is in or adjacent to project area, but would not be either directly or indirectly affected by the project.

Category 3: MIS whose habitat would be either directly or indirectly affected by the project.

Riverine & Lacustrine: There is no habitat classified as RIV or LAC in or adjacent to the project area.

Riparian: There is no habitat classified as MRI or VRI in or adjacent to the project area.

Wet Meadow: Although there are 3 acres of wet meadow within the project area, this habitat would not be directly or indirectly affected by the project. Kennedy meadow and Burton Meadow are not in areas that will be treated with underburning.

Snags in Burned Forest: There have been no recent fires and therefore no Snags in Burned Forest within the project area. The area east of the project area was the location of the 2010 Sheep Fire Complex. The Sheep Fire was primarily low and moderate intensity with a fire perimeter of 9,020 acres. A small amount of potentially suitable habitat for black-backed woodpeckers is within the Sheep Fire perimeter but would not be affected by the Boulder Project.

The MIS whose habitat would be either directly or indirectly affected by the Boulder Project, identified as Category 3 in Table 1, are carried forward in this analysis, which will evaluate the direct, indirect, and cumulative effects of the alternatives on the habitat of these MIS. The MIS selected for project-level MIS analysis for the Boulder Project are: fox sparrow, mule deer, mountain quail, sooty grouse, California spotted owl, American marten, northern flying squirrel, and hairy woodpecker.

3. Bioregional Monitoring Requirements for MIS Selected for Project-Level Analysis

3.a. MIS Monitoring Requirements.

The Sierra Nevada Forests Management Indicator Species (SNF MIS) Amendment (USDA Forest Service 2007a) identifies bioregional scale habitat and/or population monitoring for the Management Indicator Species for ten National Forests, including the Sequoia NF. The habitat and/or population monitoring requirements for Sequoia NF's MIS are described in the 2010 Sierra Nevada Forests Bioregional Management Indicator Species (SNF Bioregional MIS) Report (USDA Forest Service 2010a) and are summarized below for the MIS being analyzed for the Boulder Project. The applicable habitat and/or population monitoring results are also described in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a) and are summarized in Section 5 below for the MIS being analyzed for the Boulder Project.

Habitat monitoring at the bioregional scale is identified for all the habitats and ecosystem components, including the following analyzed for the Boulder Project: shrubland; oak-associated hardwood & hardwood/conifer; early seral coniferous forest; mid seral coniferous forest; late seral open canopy coniferous forest; late seral closed canopy coniferous forest; and snags in green forest.

Population monitoring at the bioregional scale for fox sparrow, mule deer, mountain quail, sooty grouse, California spotted owl, American marten, northern flying squirrel, and hairy

woodpecker: distribution population monitoring. Distribution population monitoring consists of collecting presence data for the MIS across a number of sample locations over time (also see USDA Forest Service 2001, Appendix E).

3.b. How MIS Monitoring Requirements are Being Met.

Habitat and/or distribution population monitoring for all MIS is conducted at the Sierra Nevada scale. Refer to the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a) for details.

4. Description of Proposed Project.

Existing Environment

The proposed project area is located in the eastern portion of the Hume Lake Ranger District of Sequoia National Forest and Giant Sequoia National Monument in Townships 13 and 14 South, Ranges 29 and 30 East (Mount Diablo Base and Meridian). The project area boundaries are the Sheep Fire edge and Deer Meadow Trail (Forest Trail 30E05) on the east, portions of Big Meadows and Burton Pass roads (Forest Road (FR) 14S11 and 14S02 respectively) on the south, a portion of FR 13S26 on the west, and State Highway 180 and the Kings River on the north. The project area includes portions of Monarch Wilderness, Agnew Roadless Area, the Wild and Scenic South Fork of the Kings River, giant sequoia groves (Agnew, Deer Meadow and Evans Complex). The project area encompasses approximately 14,385 acres and is within Fresno and Tulare Counties, California. Elevations in the project area range from a low of approximately 3,200 feet near the Kings River to 8,500 feet near the Deer Meadow Grove. The proposed project area is described in detail in the Boulder Creek Fuel Restoration Project Environmental Assessment (USDA Forest Service 2012).

The habitat in the area is comprised primarily of mixed conifer, oak woodland and chaparral. The higher elevations are dominated by conifer stands, while the lower elevations are in the transition zone between the conifer and hardwood/shrub/grassland vegetation types. The MIS vegetation types in the project area are described in Table 2.

Table 2. MIS Vegetation Types in the Boulder Project Area.

MIS Vegetation Types	Boulder Project Area (approximate acres)
Riverine & Lacustrine	0
Shrubland (west-slope chaparral types)	2,000
Oak-associated Hardwoods & Hardwood/conifers	2,350
Riparian	0
Wet Meadow	3
Early Seral Coniferous	614
Mid Seral Coniferous	5,063
Late Seral Open Canopy Coniferous	27
Late Seral Closed Canopy Coniferous	4,001

Description of Alternatives

The purpose of the proposed Boulder Project is to:

- Reduce excessive fuel loads across the landscape;
- Re-establish fire to this fire-adapted ecosystem;
- Reduce the risk of loss of old-growth forest habitat to large scale, stand-replacing wildfires; and
- Reduce the risk of loss of cultural resources to wildfires.

The Boulder Creek Fuel Restoration Project Environmental Assessment (USDA Forest Service 2012) presents one action alternative and a no action alternative. That document details the alternatives, which are summarized here.

Alternative 1 (No Action). Under the No Action alternative, current management plans would continue to guide management of the project area. No prescribed burning would be implemented to accomplish project goals.

Alternative 2 (Proposed Action). This alternative would reintroduce fire into the lower portion of the Boulder Creek drainage with prescribed burning on 6,000 to 9,000 acres. Not all of the project area would be treated, due to large areas of rock and other features that would need other treatments prior to, or instead of, prescribed fire.

This alternative was designed to limit the impact smoke would have on the airshed. Prescribed fires would be ignited in the fall, with some limited ignitions in the spring, one or two weeks prior to a predicted rain/snow event. This would allow the prescribed fire to burn long enough to achieve resource goals before wetting rains or snow extinguish the active burning in the project area. The duration of active burning and smoke impact on the airshed is expected to be two weeks.

The project area would be burned in sections over approximately 5 years. The burn treatments would begin on the east side of Boulder Creek in year one and work in a counter-clockwise direction over the years. The Boulder Creek Fuel Restoration Project Environmental Assessment (USDA Forest Service 2012) provides a detail description and maps of the proposed treatments. The treatments are designed to reintroduce fire and produce a mosaic of age classes, tree size and species composition across the landscape. No mechanical treatments or removal of logs or other forest products is proposed under this project.

After the prescribed burn treatments, hand crews would repair trail tread if the burning activities damaged hiking trails. The treadwork may include reestablishing waterbars or other drainage features along the trail. These activities would be designed to reduce the potential for erosion or sedimentation as a result of the fuels reduction activities, and manage that portion of trail to standard.

5. Effects of Proposed Project on the Habitat for the Selected Project-Level MIS.

The following section documents the analysis for the following ‘Category 3’ species: fox sparrow, mule deer, mountain quail, sooty grouse, California spotted owl, American marten, northern flying squirrel, and hairy woodpecker. The analysis of the effects of the Boulder Project on the MIS habitat for the selected project-level MIS is conducted at the project scale. The analysis used the following habitat data: Sequoia National Forest Existing Vegetation (Eveg) polygon layer updated in 2007 (published February 2010).

Detailed information on the MIS is documented in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Cumulative effects at the bioregional scale are tracked via the SNF MIS Bioregional monitoring, and detailed in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

For the purpose of the analysis of direct and indirect effects in this document, the project area is defined as the units (14,385 acres) identified in Map 1. Prescribed burning is not proposed for the entire project area.

Past, Current, and Potential Future Activities in the Analysis Area

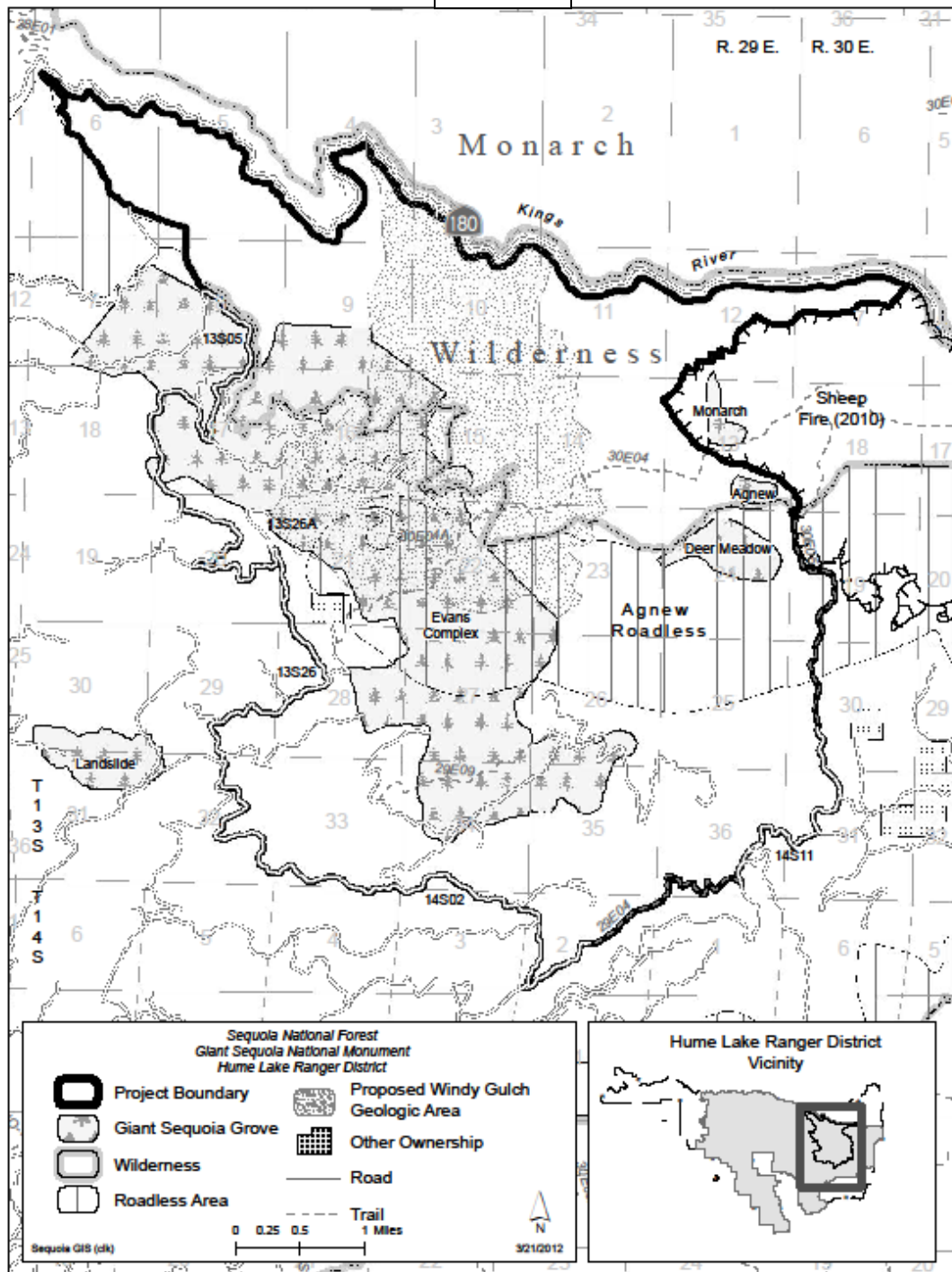
The cumulative effects sections of this document places the action alternatives in context with past, present, and reasonably foreseeable actions which, when considered collectively, may affect MIS habitat. The spatial scale for the cumulative effects analysis of the Boulder Project is composed of the Upper Boulder Creek, Lower Boulder Creek and Tenmile Creek subwatersheds, which cover approximately 68,175 acres. This is an appropriate scale for determining cumulative effects to MIS, since it includes all suitable habitat potentially affected by implementation of the Boulder Project.

The temporal scale for this analysis extends from 2008 to 2017. Vegetation data for the Forest includes spatial ecological and vegetation layers created from remote-sensing imagery obtained at various points in time, which are verified using photo-imagery, on-the-ground measurements, and tracking of vegetation-changing actions or events (for example, vegetation management and wildland fires). Past actions considered in this analysis are listed below and include those that have occurred since the last forest mapping update in 2007. For assessment of future projects, the Forest completes a quarterly “Schedule of Proposed Actions (SOPA)” which tracks proposals that are ongoing or have sufficient detail to insure they are reasonably foreseeable. The total list of actions presented on the SOPA is not included here. Some projects have been cancelled or are undergoing revision, with others not included because they have limited scope and intensity and present no appreciative impact on available habitat.

Climate changes will likely cause changes in the distribution of MIS in the project area. Modeling efforts have projected that forest types and other vegetation dominated by woody plants in California would migrate to higher elevations as warmer temperatures make those areas suitable for colonization and survival. For example, with higher temperatures and a longer growing season, the area occupied by subalpine and alpine vegetation was

predicted to decrease as evergreen conifer forests and shrublands migrate to higher elevations. The precise effects of climate change on individual MIS are difficult to predict and will not be addressed in the effects analysis.

Map 1



Past and Current Activities

Grazing: Portions of the Buck Rock, Hoist and Horse Corral cattle grazing allotments are within the Boulder Project cumulative effects analysis area. Because grazing is a past, ongoing, and foreseeable future action and because use levels and associated impacts from this activity are not expected to change as a result of implementation of the proposed action, cattle grazing activity is not expected to contribute measurable impacts to MIS habitats.

Vegetation Management:

- *Roadside Hazard Tree Removal:* Beginning in 2009, dead or damaged trees along major district roads (Including some in the analysis area) that posed a safety hazard or danger to public/employees were felled. Some of the trees were removed.
- *Prescribed Burning:* The Tornado Burn Project resulted in underburning approximately 200 acres since 2008. Additional small piling and burning projects have occurred along some of the major roads in the analysis area.

Wildfires: No wildfires greater than 25 acres have occurred in the analysis area since 2007. The Sheep fire, which occurred in 2010, was in a subwatershed adjacent to the analysis area.

Recreation: The analysis area is used regularly by campers, hunters and OHV users. There are approximately 215 miles of road in the analysis area, with State Highway 180 providing primary vehicular access. Because recreation is a past, ongoing, and foreseeable future action and because use levels and associated impacts from this activity are not expected to change as a result of implementation of the proposed action, recreation is not expected to contribute measurable impacts to habitats.

Potential Future Activities (From the SOPA dated 04/2012):

Vegetation Management/Silviculture Treatments:

- *Kirkland Plantation Thin:* Proposes to masticate small trees (less than 10 inches dbh) and brush causing overstocked conditions in plantations near Kirkland Meadow and underburn or pile and burn fuel concentrations leaving 80-120 trees per acre and pockets of untreated shrubs for wildlife.
- *Hume District Roadside Hazard Tree Removal:* Proposal to fell dead or damaged trees along district roads (Including 35 miles in the analysis area) that pose a safety hazard or danger to public/employees using these routes. Some trees may be removed after down woody debris requirements are met.

Shrubland (West-Slope Chaparral) Habitat (Fox Sparrow)

Habitat/Species Relationship.

The fox sparrow was selected as the MIS for shrubland (chaparral) habitat on the west-slope of the Sierra Nevada, comprised of montane chaparral (MCP), mixed chaparral (MCH), and chamise-redshank chaparral (CRC) as defined by the California Wildlife Habitat Relationships

System (CWHR) (CDFG 2005). Recent empirical data from the Sierra Nevada indicate that, in the Sierra Nevada, the fox sparrow is dependent on open shrub-dominated habitats for breeding (Burnett and Humple 2003, Burnett et al. 2005, Sierra Nevada Research Center 2007).

Project-level Effects Analysis - Shrubland (West-Slope Chaparral) Habitat

Habitat Factor(s) for the Analysis: (1) Acres of shrubland (chaparral) habitat [CWHR montane chaparral (MCP), mixed chaparral (MCH), and chamise-redshank chaparral (CRC)]. (2) Acres with changes in shrub ground cover class (Sparse=10-24%; Open=25-39%; Moderate=40-59%; Dense=60-100%). (3) Acres with changes in CWHR shrub size class (Seedling shrub (seedlings or sprouts <3 years); Young shrub (no crown decadence); Mature Shrub (crown decadence 1-25%); Decadent shrub (>25%).

Current Condition of the Habitat Factor(s) in the Project Area: There are 2,000 acres of shrubland (1,275 acres of MCP and 725 acres of MCH) in the project area. The shrub ground cover classes and size class are unknown for the area.

Alternative 2 (Proposed Action)

Direct and Indirect Effects to Habitat. There are 1,878 acres of this habitat in units that may be treated with underburning (not all the areas will be burned; fire may be excluded in plantations, cultural resource sites and other areas of concern). Underburning will kill some shrubs. The burning prescription is intended to result in a low intensity backing fire that would result in a mosaic of effects. Some shrubs would be trimmed along trails used as control lines.

Implementation of this alternative will result in (1) no change in acres of shrubland habitat, (2) a reduction in shrub ground cover classes on some acres following underburning, and (3) a reduction in CWHR size classes of shrubs on some acres where older shrubs are killed by underburning.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting shrubland habitat are described on page 11 of this document.

None of the past, present or reasonably foreseeable future actions in the analysis area would measurably affect shrubland habitat. The cumulative effects would result in a reduction of shrub ground cover on less than 26% of the 7,332 acres of shrublands in the analysis area.

Cumulative Effects Conclusion: The direct, indirect, and cumulative effects of the Boulder Project Alternative 2 will result in: (1) no change in acres of shrubland habitat, (2) a reduction in shrub ground cover classes on fewer than 1,878 acres following prescribed burning, and (3) a reduction in CWHR size classes of shrubs on some acres where older shrubs are killed by underburning.

Summary of Fox Sparrow Status and Trend at the Bioregional Scale

The Sequoia NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the fox sparrow; hence, the shrubland effects analysis for the Boulder Project must be informed by both habitat and distribution population

monitoring data. The sections below summarize the habitat and distribution population status and trend data for the fox sparrow. This information is drawn from the detailed information on habitat and population trends in the 2010 Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 1,009,681 acres of west-slope chaparral shrubland habitat on National Forest System lands in the Sierra Nevada. Over the last two decades, the trend is slightly increasing (changing from 8% to 9% of the acres on National Forest System lands).

Population Status and Trend. Monitoring of the fox sparrow across the ten National Forests in the Sierra Nevada has been conducted since 2009 in partnership with PRBO Conservation Science, as part of a monitoring effort that also includes mountain quail, hairy woodpecker, and yellow warbler (USDA Forest Service 2010a, <http://data.prbo.org/partners/usfs/snmis/>). Fox sparrows were detected on 36.9% of 1659 point counts in 2009 and 44.3% of 2266 point counts in 2010, with detections on all 10 national forests in both years. The average abundance (number of individuals recorded on passive point count surveys) was 0.563 in 2009 and 0.701 in 2010. These data indicate that fox sparrows continue to be distributed across the 10 Sierra Nevada National Forests. In addition, the fox sparrows continue to be monitored and surveyed in the Sierra Nevada at various sample locations by avian point count, spot mapping, mist-net, and breeding bird survey protocols. These are summarized in the 2008 Bioregional Monitoring Report (USDA Forest Service 2008). Current data at the rangewide, California, and Sierra Nevada scales indicate that, although there may be localized declines in the population trend, the distribution of fox sparrow populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Fox Sparrow Trend.

Since the Boulder Project will result in a reduction in shrub ground cover classes on less than 0.2% of existing shrubland habitat and a reduction in CWHR size classes of shrubs on only a small number of acres, this project will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of fox sparrows across the Sierra Nevada bioregion.

Oak-Associated Hardwoods and Hardwood/Conifer Habitat (Mule deer)

Habitat/Species Relationship.

The mule deer was selected as the MIS for oak-associated hardwood and hardwood/conifer in the Sierra Nevada, comprised of montane hardwood (MHW) and montane hardwood-conifer (MHC) as defined by the California Wildlife Habitat Relationships System (CWHR) (CDFG 2005). Mule deer range and habitat includes coniferous forest, foothill woodland, shrubland, grassland, agricultural fields, and suburban environments (CDFG 2005). Many mule deer migrate seasonally between higher elevation summer range and low elevation winter range (Ibid). On the west slope of the Sierra Nevada, oak-associated hardwood and hardwood/conifer areas are an important winter habitat (CDFG 1998).

Project-level Effects Analysis - Oak-Associated Hardwoods and Hardwood/Conifer Habitat

Habitat Factor(s) for the Analysis: (1) Acres of oak-associated hardwood and hardwood/conifer habitat [CWHR montane hardwood (MHW), montane hardwood-conifer (MHC)]. (2) Acres with changes in hardwood canopy cover (Sparse=10-24%; Open=25-39%; Moderate=40-59%; Dense=60-100%). (3) Acres with changes in CWHR size class of hardwoods [1/2 (Seedling/Sapling) (<6" dbh); 3 (Pole) (6"-10.9" dbh); 4 (Small tree) (11"-23.9" dbh); 5 (Medium/Large tree) (≥24" dbh)]

Current Condition of the Habitat Factor(s) in the Project Area: Within the project area, there are 2,350 acres of oak-associated hardwood and hardwood/conifer habitat (2,020 acres of MHW and 330 acres of MHC). There are 664 acres in size class 3, 1,438 acres in size class 4 and 244 acres in size class 5. In the project area, 137 acres have sparse or open canopy cover, 357 acres have moderate canopy cover and 1,856 acres are classified as having dense canopy cover.

Alternative 2 (Proposed Action)

Direct and Indirect Effects to Habitat. There are 2,349 acres of this habitat in units that may be treated with underburning (not all the areas will be burned; fire may be excluded in plantations, cultural resource sites and other areas of concern). Underburning is expected to kill some oaks, primarily small trees. The burning prescription is intended to result in a low intensity backing fire that would result in a mosaic of effects. Some larger oaks may be trimmed along trails used as control lines and oaks that are safety hazards would be felled.

Implementation of this alternative will result in (1) no change in acres of oak-associated hardwood and hardwood/conifer habitats, (2) a possible reduction in hardwood canopy cover classes on acres where fire burns hot enough to kill patches of trees, and (3) no change in CWHR size classes of hardwoods on any acres.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting oak-associated hardwood and hardwood/conifer habitat are described on page 11 of this document.

Less than ten acres of oak-associated hardwoods and hardwood/conifer habitat was underburned during the Tornado Burn project. The future Hume District Roadside Hazard Tree Removal Project could remove trees along roads in this habitat if they are safety hazards. There are no other past, present or foreseeable future actions potentially affecting oak-associated hardwoods and hardwood/conifer habitat within the analysis area. The cumulative effects could result in a reduction of hardwood canopy cover on a small number of the 8,155 acres of oak-associated hardwood and hardwood/conifer habitats in the analysis area.

Cumulative Effects Conclusion: The direct, indirect, and cumulative effects of the Boulder Project Alternative 2 will result in: (1) no change in acres of oak-associated hardwood and hardwood/conifer habitats, (2) a possible reduction of hardwood canopy cover classes on a small number of acres due to mortality during prescribed burning, and (3) no change in CWHR size classes of hardwoods on any acres.

Summary of Mule Deer Status and Trend at the Bioregional Scale

The Sequoia NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the mule deer; hence, the oak-associated hardwood and hardwood/conifer effects analysis for the Boulder Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the mule deer. This information is drawn from the detailed information on habitat and population trends in the 2010 Sierra Nevada Forests Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 808,006 acres of oak-associated hardwood and hardwood/mixed conifer habitat on National Forest System lands in the Sierra Nevada. Over the last two decades the trend is slightly increasing (changing from 5% to 7% of the acres on National Forest System lands).

Population Status and Trend. The mule deer has been monitored in the Sierra Nevada at various sample locations by herd monitoring (spring and fall) and hunter survey and associated modeling (CDFG 2007, 2010). California Department of Fish and Game (CDFG) conducts surveys of deer herds in early spring to determine the proportion of fawns that have survived the winter, and conducts fall counts to determine herd composition (CDFG 2007). This information, along with prior year harvest information, is used to estimate overall herd size, sex and age ratios, three-year average populations, and the predicted number of bucks available to hunt (CDFG 2007, 2010). These data indicate that mule deer continue to be present across the Sierra Nevada, and current data at the range wide, California, and Sierra Nevada scales indicate that, although there may be localized declines in some herds or Deer Assessment Units, the distribution of mule deer populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mule Deer Trend.

Since the alternatives in the Boulder Project will result in no change in acres or CWHR size classes of oak-associated hardwood and hardwood/conifer habitat, and a possible reduction of canopy cover class on less than 1% of the available habitat, this project will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of mule deer across the Sierra Nevada bioregion.

Early and Mid Seral Coniferous Forest Habitat (Mountain quail)**Habitat/Species Relationship.**

Mountain quail were selected as the MIS for early and mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada. Early seral coniferous forest habitat is comprised primarily of seedlings (<1" dbh), saplings (1"-5.9" dbh), and pole-sized trees (6"-10.9" dbh). Mid seral coniferous forest habitat is comprised primarily of small-sized trees (11"-23.9" dbh). Mountain quail are found particularly on steep slopes, in open, brushy stands of conifer and deciduous forest and woodland, and chaparral; they

may gather at water sources in the summer, and broods are seldom found more than 0.8 km (0.5 mi) from water (CDFG 2005).

Project-level Effects Analysis – Early and Mid Seral Coniferous Forest Habitat

Habitat Factor(s) for the Analysis: (1) Acres of early (CWHR tree sizes 1, 2, and 3) and mid seral (CWHR tree size 4) coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat [CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree sizes 1, 2, 3, and 4, all canopy closures]. (2) Acres with changes in CWHR tree size class. (3) Acres with changes in tree canopy closure. (4) Acres with changes in understory shrub canopy closure.

Current Condition of the Habitat Factor(s) in the Project Area: In the proposed treatment area, there are 614 acres of early seral coniferous forest (48 acres PPN; 70 acres RFR; 486 acres SMC) and 5,063 acres of mid seral coniferous forest (363 acres PPN; 427 acres RFR; 4,273 acres SMC). In early seral coniferous forest there are 313 acres with sparse or partial tree canopy closure, 260 acres with moderate tree canopy closure and 41 acres with dense tree canopy closure. In mid seral coniferous forest there are 481 acres with sparse or partial tree canopy closure, 1,851 acres with moderate tree canopy closure and 2,731 acres with dense tree canopy closure.

Alternative 2 (Proposed Action)

Direct and Indirect Effects to Habitat. There are 326 acres of early seral and 3,560 acres of mid seral coniferous forest habitat in units that may be treated with underburning (not all the areas will be burned; fire may be excluded in plantations, cultural resource sites and other areas of concern). Underburning is expected to kill some shrubs and smaller trees. Modeling (FOFEM5) for this projected mortality of five to 34 percent of trees in early seral sizes and three to five percent of the conifers in the mid seral size class. The burning prescription is intended to result in a low intensity backing fire that would result in a mosaic of effects. Some trees may be trimmed along trails used as control lines and trees that are safety hazards would be felled.

Implementation of Alternative 2 will result in: (1) no change in acres of early and mid seral coniferous forest habitat, (2) a possible reduction of CWHR size class on some acres, depending on mortality patterns, (3) a reduction in tree canopy closure on some of the 3,886 acres (the FOFEM5 model projected a reduction of zero to three percent), and (4) a decrease in understory shrub canopy closure.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting early seral and mid seral coniferous forest habitat are described on page 11 of this document.

In addition to the 3,886 acres of early and mid seral coniferous forest habitat potentially affected by this project, tree canopy closure and understory shrub canopy closure was reduced on fewer than 100 acres by the Tornado burn project. The Kirkland Thin Project would reduce tree canopy closure and understory shrub canopy closure on a maximum of 477 additional acres. The

2009 Roadside Hazard Tree Removal Project removed a small number of trees from this habitat. The future Hume District Roadside Hazard Tree Removal Project could remove trees along roads in this habitat if they are safety hazards. There are no other past, present or foreseeable future actions potentially affecting early and mid seral coniferous forest habitat within the analysis area. The cumulative effects would occur on approximately 13% of the 33,827 acres of early seral and mid seral coniferous forest habitat in the analysis area.

Cumulative Effects Conclusion: The direct, indirect, and cumulative effects of the Boulder Project Alternative 2 will result in: (1) no change in acres of early and mid seral coniferous forest habitat, (2) a possible reduction of CWHR size class on some acres, depending on mortality patterns, (3) a reduction in tree canopy closure on fewer than 4,463 acres, and (4) a decrease in understory shrub canopy closure on fewer than 4,463 acres.

Summary of Mountain Quail Status and Trend at the Bioregional Scale

The Sequoia NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for mountain quail; hence, the early and mid seral coniferous forest effects analysis for the Boulder Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for mountain quail. This information is drawn from the detailed information on habitat and population trends in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 530,851 acres of early seral and 2,776,022 acres of mid seral coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands in the Sierra Nevada. Over the last two decades, the trend for early seral is decreasing (changing from 9% to 5% of the acres on National Forest System lands) and the trend for mid seral is increasing (changing from 21% to 25% of the acres on National Forest System lands).

Population Status and Trend. Monitoring of mountain quail across the ten National Forests in the Sierra Nevada has been conducted since 2009 in partnership with PRBO Conservation Science, as part of a monitoring effort that also includes fox sparrow, hairy woodpecker, and yellow warbler (USDA Forest Service 2010a, <http://data.prbo.org/partners/usfs/snmis/>). Mountain quail were detected on 40.3 percent of 1,659 point counts (and 48.6% of 424 playback points) in 2009 and 47.4% of 2,266 point counts (and 55.3% of 492 playback points) in 2010, with detections on all 10 national forests in both years. The average abundance (number of individuals recorded on passive point count surveys) was 0.103 in 2009 and 0.081 in 2010. These data indicate that mountain quail continue to be distributed across the 10 Sierra Nevada National Forests. In addition, mountain quail continue to be monitored and surveyed in the Sierra Nevada at various sample locations by hunter survey, modeling, and breeding bird survey protocols. These are summarized in the 2008 Bioregional Monitoring Report (USDA Forest Service 2008). Current data at the range wide, California, and Sierra Nevada scales indicate that the distribution of mountain quail populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Mountain Quail Trend.

Since the direct, indirect, and cumulative effects of Alternative 2 of the Boulder Project would result in no change in early and mid seral coniferous forest habitat acres, a possible reduction of CWHR size class, and a reduction in tree canopy closure and shrub understory on a maximum of 4,463 acres (less than 0.2% of the early and mid seral coniferous forest habitat in the bioregion), this project will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of mountain quail across the Sierra Nevada bioregion.

Late Seral Open Canopy Coniferous Forest Habitat [Sooty (blue) grouse]**Habitat/Species Relationship.**

The sooty grouse was selected as the MIS for late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures less than 40%. Sooty grouse occurs in open, medium to mature-aged stands of fir, Douglas-fir, and other conifer habitats, interspersed with medium to large openings, and available water, and occupies a mixture of mature habitat types, shrubs, forbs, grasses, and conifer stands (CDFG 2005). Empirical data from the Sierra Nevada indicate that Sooty Grouse hooting sites are located in open, mature, fir-dominated forest, where particularly large trees are present (Bland 2006).

Project-level Effects Analysis - Late Seral Open Canopy Coniferous Forest Habitat

Habitat Factor(s) for the Analysis: (1) Acres of late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat [CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), eastside pine (EPN), tree size 5, canopy closures S and P]. (2) Acres with changes in tree canopy closure class. (3) Acres with changes in understory shrub canopy closure class.

Current Condition of the Habitat Factor(s) in the Project Area: In the project area there are 27 acres of late seral open canopy coniferous forest (7 acres PPN; 5 acres RFR; 15 acres SMC). This includes 18 acres in canopy closure P and 9 acres in canopy closure S.

Alternative 2 (Proposed Action)

Direct and Indirect Effects to Habitat. There are only 14 acres of late seral open canopy coniferous forest habitat in units that may be treated with underburning (not all the areas will be burned; fire may be excluded in plantations, cultural resource sites and other areas of concern). Underburning is expected to kill some shrubs and smaller trees. Little mortality is anticipated in trees greater than 24" dbh. The burning prescription is intended to result in a low intensity backing fire that would result in a mosaic of effects. Some trees may be trimmed along trails used as control lines and trees that are safety hazards would be felled.

Implementation of Alternative 2 will result in: (1) no change in acres of late seral open canopy coniferous forest habitat, (2) no change in CWHR tree size class on any acres, (3) no change in tree canopy closure, and (4) a decrease in understory shrub canopy cover on a maximum of 14 acres.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting late seral open canopy coniferous forest habitat are described on page 11 of this document.

There are no past, present or foreseeable future actions potentially affecting late seral open canopy coniferous forest habitat within the analysis area.

Cumulative Effects Conclusion: The direct, indirect, and cumulative effects of the Boulder Project Alternative 2 will result in: (1) no change in acres of late seral open canopy coniferous forest habitat, (2) no change in CWHR tree size class on any acres, (3) no change in tree canopy closure, and (4) a decrease in understory shrub canopy cover on a maximum of 14 acres.

Summary of Sooty Grouse Status and Trend at the Bioregional Scale

The Sequoia NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for sooty grouse; hence, the late seral open canopy coniferous forest effects analysis for the Boulder Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for sooty grouse. This information is drawn from the detailed information on habitat and population trends in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 63,795 acres of late seral open canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, red fir, and eastside pine) habitat on National Forest System lands in the Sierra Nevada. Over the last two decades, the trend is decreasing (changing from 3% to 1% of the acres on National Forest System lands).

Population Status and Trend. Sooty grouse have been monitored in the Sierra Nevada at various sample locations by hunter survey, modeling, point counts, and breeding bird survey protocols, including California Department of Fish and Game Blue (Sooty) Grouse Surveys (Bland 1993, 1997, 2002, 2006); California Department of Fish and Game hunter survey, modeling, and hunting regulations assessment (CDFG 2004a, CDFG 2004b); Multi-species inventory and monitoring on the Lake Tahoe Basin Management Unit (LTBMU 2007); and 1968 to present – BBS routes throughout the Sierra Nevada (Sauer et al. 2007). These data indicate that sooty grouse continue to be present across the Sierra Nevada, except in the area south of the Kern Gap, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of sooty grouse populations in the Sierra Nevada north of the Kern Gap is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Sooty Grouse Trend.

Since the direct, indirect, and cumulative effects of Alternative 2 of the Boulder Project will result in no change in the number of acres of late seral open canopy coniferous forest habitat, size classes or tree canopy closure and a reduction in shrub understory on a maximum of 14 acres, this project will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of sooty grouse across the Sierra Nevada bioregion.

Late Seral Closed Canopy Coniferous Forest Habitat (California spotted owl, American marten, and northern flying squirrel)**Habitat/Species Relationship.**

California spotted owl. The California spotted owl was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures above 40% within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. The California spotted owl is strongly associated with forests that have a complex multi-layered structure, large-diameter trees, and high canopy closure (CDFG 2005, USFWS 2006). It uses dense, multi-layered canopy cover for roost seclusion; roost selection appears to be related closely to thermoregulatory needs, and the species appears to be intolerant of high temperatures (CDFG 2005). Mature, multi-layered forest stands are required for breeding (Ibid). The mixed-conifer forest type is the predominant type used by spotted owls in the Sierra Nevada: about 80 percent of known sites are found in mixed-conifer forest, with 10 percent in red fir forest (USDA Forest Service 2001).

American Marten. The American marten was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures above 40% within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. Martens prefer coniferous forest habitat with large diameter trees and snags, large down logs, moderate-to-high canopy closure, and an interspersed of riparian areas and meadows. Important habitat attributes are: vegetative diversity, with predominately mature forest; snags; dispersal cover; and large woody debris (Allen 1982). Key components for westside and eastside marten habitat can be found in the Sierra Nevada Forest Plan Amendment FEIS (USDA Forest Service 2001), Volume 3, Chapter 3, part 4.4, pages 20-21.

Northern flying squirrel. The northern flying squirrel was selected as an MIS for late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat in the Sierra Nevada. This habitat is comprised primarily of medium/large trees (equal to or greater than 24 inches dbh) with canopy closures above 40% within ponderosa pine, Sierran mixed conifer, white fir, and red fir coniferous forests, and multi-layered trees within ponderosa pine and Sierran mixed conifer forests. The northern flying squirrel occurs primarily in mature,

dense conifer habitats intermixed with various riparian habitats, using cavities in mature trees, snags, or logs for cover (CDFG 2005).

Project-level Effects Analysis – Late Seral Closed Canopy Coniferous Forest Habitat.

Habitat Factor(s) for the Analysis: (1) Acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat [CWHR ponderosa pine (PPN), Sierran mixed conifer (SMC), white fir (WFR), red fir (RFR), tree size 5 (canopy closures M and D), and tree size 6]. (2) Acres with changes in canopy closure (D to M). (3) Acres with changes in large snags (>15" dbh) per acre.

Current Condition of the Habitat Factor(s) in the Project Area: In the project area, there are 4,001 acres of late seral closed canopy coniferous forest habitat (81 acres PPN; 448 acres RFR; 3,471 acres SMC). There are 303 acres with moderate canopy closure and 3,698 acres with dense canopy cover. No current, site specific snag density data are available for the project area.

Alternative 2 (Proposed Action)

Direct and Indirect Effects to Habitat. There are only 3,272 acres of late seral closed canopy coniferous forest habitat in units that may be treated with underburning (not all the areas will be burned; fire may be excluded in plantations, cultural resource sites and other areas of concern). Underburning is expected to kill some shrubs and smaller trees. Little mortality is anticipated in trees greater than 24" dbh. The burning prescription is intended to result in a low intensity backing fire that would result in a mosaic of effects. Some trees may be trimmed along trails used as control lines and trees that are safety hazards would be felled.

Implementation of Alternative 2 will result in: (1) no change in acres of late seral closed canopy coniferous forest; (2) the possibility of a slight reduction in canopy closure on some acres (estimated to be less than 1% using the FOFEM5 model); and (3) little change in the number of average large snags per acre, depending on fire behavior (underburning is likely to both create and remove snags).

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting late seral closed-canopy coniferous forest habitat are described on page 11 of this document.

In addition to the 3,272 acres of late seral closed canopy coniferous forest habitat potentially affected by this project, tree canopy closure was reduced on fewer than 100 acres by the Tornado burn project. The 2009 Roadside Hazard Tree Removal Project removed a small number of trees and snags from this habitat. The future Hume District Roadside Hazard Tree Removal Project could remove trees and snags along roads in this habitat if they are safety hazards. The Kirkland Thin Project could reduce canopy closure on a maximum of 28 acres. There are no other past, present or foreseeable future actions potentially affecting late seral closed canopy coniferous forest habitat within the analysis area. The cumulative effects would occur on less than 30% of the 11,701 acres of late seral closed canopy coniferous forest habitat in the analysis area.

Cumulative Effects Conclusion: The direct, indirect, and cumulative effects of the Boulder Project Alternative 2 will result in: (1) no change in acres of late seral closed canopy coniferous forest; (2) the possibility of a slight reduction in canopy closure on some acres (estimated to be less than 1% using the FOFEM5 model); and (3) little change in the number of average large snags per acre, depending on fire behavior (underburning is likely to both create and remove snags).

Summary of Status and Trend at the Bioregional Scale

California spotted owl, American marten, and Northern flying squirrel. The Sequoia NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the California spotted owl, American marten, and northern flying squirrel; hence, the late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat effects analysis for the Boulder Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data. This information is drawn from the detailed information on habitat and population trends in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Habitat Status and Trend. There are currently 1,006,923 acres of late seral closed canopy coniferous forest (ponderosa pine, Sierran mixed conifer, white fir, and red fir) habitat on National Forest System lands in the Sierra Nevada. Over the last two decades, the trend is slightly increasing (changing from 7% to 9% of the acres on National Forest System lands); since the early 2000s, the trend has been stable at 9%.

Population Status and Trend - California spotted owl. California spotted owl has been monitored in California and throughout the Sierra Nevada through general surveys, monitoring of nests and territorial birds, and demography studies (Verner et al. 1992; Gutierrez et al. 2008, 2009, 2010; USDA Forest Service 2001, 2004, 2006b; USFWS 2006; Sierra Nevada Research Center 2007, 2008, 2009, 2010). Current data at the rangewide, California, and Sierra Nevada scales indicate that, although there may be localized declines in population trend [e.g., localized decreases in “lambda” (estimated annual rate of population change)], the distribution of California spotted owl populations in the Sierra Nevada is stable.

Population Status and Trend – American marten. American marten has been monitored throughout the Sierra Nevada as part of general surveys and studies since 1996 (e.g. Zielinski et al. 2005, Moriarty 2009). Since 2002, the American marten has been monitored on the Sierra Nevada forests as part of the Sierra Nevada Forest Plan Amendment (SNFPA) monitoring plan (USDA Forest Service 2005, 2006b, 2007b, 2009, 2010b). Current data at the rangewide, California, and Sierra Nevada scales indicate that, although marten appear to be distributed throughout their historic range, their distribution has become fragmented in the southern Cascades and northern Sierra Nevada, particularly in Plumas County. The distribution appears to be continuous across high-elevation forests from Placer County south through the southern end of the Sierra

Nevada, although detection rates have decreased in at least some localized areas (e.g., Sagehen Basin area of Nevada County).

Population Status and Trend – northern flying squirrel. The northern flying squirrel has been monitored in the Sierra Nevada at various sample locations by live-trapping, ear-tagging, camera surveys, snap-trapping, and radiotelemetry: 2002-present on the Plumas and Lassen National Forests (Sierra Nevada Research Center 2007, 2008, 2009, 2010), and 1958-2004 throughout the Sierra Nevada in various monitoring efforts and studies (see USDA Forest Service 2008, Table NOFLS-IV-1). These data indicate that northern flying squirrels continue to be present at these sample sites, and current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of northern flying squirrel populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Trends.

California spotted owls. Since the direct, indirect, and cumulative effects of the Boulder Project Alternative 2 will result in no change in acres of late seral closed canopy coniferous forest habitat, a slight reduction in canopy closure (estimated to be less than one percent), and little change in the average large snags per acre, this project will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of California spotted owls across the Sierra Nevada bioregion.

American martens. Since the direct, indirect, and cumulative effects of the Boulder Project Alternative 2 will result in no change in acres of late seral closed canopy coniferous forest habitat, a slight reduction in canopy closure (estimated to be less than one percent), and little change in the average large snags per acre, this project will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of American martens across the Sierra Nevada bioregion.

Northern flying squirrels. Since the direct, indirect, and cumulative effects of the Boulder Project Alternative 2 will result in no change in acres of late seral closed canopy coniferous forest habitat, a slight reduction in canopy closure (estimated to be less than one percent), and little change in the average large snags per acre, this project will not alter the existing trend in the habitat, nor will it lead to a change in the distribution of northern flying squirrels across the Sierra Nevada bioregion.

Snags in Green Forest Ecosystem Component (Hairy woodpecker)

Habitat/Species Relationship.

The hairy woodpecker was selected as the MIS for the ecosystem component of snags in green forests. Medium (diameter breast height between 15 to 30 inches) and large (diameter breast height greater than 30 inches) snags are most important. The hairy woodpecker uses stands of large, mature trees and snags of sparse to intermediate density; cover is also provided by tree

cavities (CDFG 2005). Mature timber and dead snags or trees of moderate to large size are apparently more important than tree species (Siegel and DeSante 1999).

Project-level Effects Analysis – Snags in Green Forest Ecosystem Component

Habitat Factor(s) for the Analysis: (1) Medium and Large (>15 inches dbh) snags per acre. (2) Large (greater than 30 inches dbh) snags per acre.

Current Condition of the Habitat Factor(s) in the Project Area: No current, site specific snag density data are available for the project area. 2010 Sierra Nevada Region numbers of existing snags greater than 15 inches dbh by vegetation type are shown in Table 3. For the vegetation types in the project area, snags greater than 15 inches dbh ranged from 0.5 to 6.6 snags per acre. The weighted average is 3.8 snags greater than 15 inches dbh.

Table 3. Snag Information

Forest Type	Sierra Region Average Snags Per Acre (equal to or greater than 15" dbh)¹	Acres in Project Area
Westside mixed conifer (SMC)	4.61	8,246
Ponderosa pine	2.78	508
Hardwoods (productive)	2.01	609
Hardwoods (non- productive)	1.25	1,741
Lodgepole pine	4.17	12
Red fir	6.66	951
Shrub types (productive)	2.66	1,275
Shrub types (non- productive)	0.51	725

¹Based on data from 2010 Sierra Nevada Forests Bioregional MIS Report

Alternative 2

Direct and Indirect Effects to Habitat. Prescribed fire treatments are expected to both create new snags and result in the loss of some existing snags on some of the 11,665 acres with active fire treatments. It is possible that a small number of snags near containment lines would be felled if they provide a safety hazard to fire personnel. Implementation of these alternatives will result in: (1) little change in the number of medium and large snags (>15" dbh, but <30" dbh) per acre (depending on fire behavior); (2) little change in large snags (>30" dbh) per acre. Very little mortality in trees greater than 30" dbh is expected.

Cumulative Effects to Habitat in the Analysis Area. Past, present, and reasonably foreseeable future actions affecting snags in green forest habitat are described on page 11 of this document.

In addition to the forest habitat potentially affected by this project, snags were both created and lost by the Tornado burn project on fewer than 100 acres. The 2009 Roadside Hazard Tree Removal Project removed a small number of snags that were safety hazards. The future Hume District Roadside Hazard Tree Removal Project could remove snags along roads if they are safety hazards. The Kirkland Thin Project could remove snags if they are safety hazards and both create and remove snags through prescribed burning. Snags that are safety hazards at developed recreation sites, like campgrounds, may also be removed if necessary. There are no other past, present or foreseeable future actions potentially affecting snags in green forest within the analysis area.

Cumulative Effects Conclusion: The direct, indirect, and cumulative effects of the Boulder Project Alternative 2 will result in: (1) little change in the number of medium and large snags (>15" dbh, but <30" dbh) per acre (depending on fire behavior and safety requirements); (2) little change in large snags (>30" dbh) per acre (safety hazards may be removed and prescribed fire would have little impact).

Summary of Hairy Woodpecker Status and Trend at the Bioregional Scale

The Sequoia NF LRMP (as amended by the SNF MIS Amendment) requires bioregional-scale habitat and distribution population monitoring for the hairy woodpecker; hence, the snag effects analysis for the Boulder Project must be informed by both habitat and distribution population monitoring data. The sections below summarize the habitat and distribution population status and trend data for the hairy woodpecker. This information is drawn from the detailed information on habitat and distribution population trends in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a), which is hereby incorporated by reference.

Ecosystem Component Status and Trend. The current average number of medium-sized and large-sized snags (≥ 15 " dbh, all decay classes) per acre across major coniferous and hardwood forest types (westside mixed conifer, ponderosa pine, white fir, productive hardwoods, red fir, eastside pine) in the Sierra Nevada ranges from 1.5 per acre in eastside pine to 9.1 per acre in white fir. In 2008, snags in these types ranged from 1.4 per acre in eastside pine to 8.3 per acre in white fir (USDA Forest Service 2008).

Data from the early-to-mid 2000s were compared with the current data to calculate the trend in total snags per acre by Regional forest type for the 10 Sierra Nevada national forests and indicate that, during this period, snags per acre increased within westside mixed conifer (+0.76), white fir (+2.66), productive hardwoods (+0.35), and red fir (+1.25) and decreased within ponderosa pine (-0.16) and eastside pine (-0.14). Detailed information by forest type, snag size, and snag decay class can be found in the 2010 SNF Bioregional MIS Report (USDA Forest Service 2010a).

Population Status and Trend. Monitoring of hairy woodpeckers across the ten National Forests in the Sierra Nevada has been conducted since 2009 in partnership with PRBO Conservation Science, as part of a monitoring effort that also includes mountain quail, fox sparrow, and yellow warbler (USDA Forest Service 2010a, <http://data.prbo.org/partners/usfs/snmis/>). Hairy woodpeckers were detected on 15.1% of 1,659 point counts (and 25.2% of 424 playback points) in 2009 and 16.7% of 2,266 point counts (and 25.6% of 492 playback points) in 2010, with detections on all 10 national forests in both years. The average abundance (number of individuals recorded on passive point count surveys) was 0.116 in 2009 and 0.107 in 2010. These data indicate that hairy woodpeckers continue to be distributed across the 10 Sierra Nevada National Forests. In addition, hairy woodpeckers continue to be monitored and surveyed in the Sierra Nevada at various sample locations by avian point count and breeding bird survey protocols. These are summarized in the 2008 Bioregional Monitoring Report (USDA Forest Service 2008). Current data at the rangewide, California, and Sierra Nevada scales indicate that the distribution of hairy woodpecker populations in the Sierra Nevada is stable.

Relationship of Project-Level Habitat Impacts to Bioregional-Scale Hairy Woodpecker Trend.

Since the direct, indirect, and cumulative effects of the Boulder Project Alternative 2 will result in little change in the number of snags >15" dbh per acre and little change in large snags (>30" dbh) per acre (snags could be lost and created by prescribed fire; safety hazards would be removed if necessary), this project will not alter the existing trend in snags, nor will it lead to a change in the distribution of hairy woodpeckers across the Sierra Nevada bioregion.

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